DOCUMENT RESUME

ED 180 239 FL 010 893

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TITLE Some External Factors Which Might Affect L2 Learning.
PUB DATE [79]
NOTE 18p.: Paper presented at the symposium, "Problems of Child Speech" (Belgrade, Yugoslavia, April 5-6, 1979)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Achievement: *Audition (Physiology): *Aurally Handicapped: Correlation; Elementary School Students: *English (Second Language): Junior High School Students: Language Instruction; Language Research: Longitudinal Studies: Motivation; Phonemes; *Pronunciation: Pronunciation Instruction: *Second Language Learning: *Success Factors
IDENTIFIERS *Yugoslavs

ABSTRACT

Yugoslav elementary school students of English as a second language were the subjects of a longitudinal study to determine factors influencing the acquisition of correct English pronunciation. The students were tested for their ability to articulate 32 sounds within ten specific English words. The test was administered each year from the second through the eighth year of English instruction. It was found that pronunciation proficiency varied inversely with degree of hearing impairment, beginning with the second year of study. By the sixth year, this correlation was virtually reversed, and students with perfect hearing were turning in the worst performances. Among the variables that were examined, two seem to have contributed to this trend: hearing-imparied students tended to be more highly motivated than those with perfect hearing; and there was a strong correlation between written test and hearing test scores, but only for hearing-imparied students (i.e., these students seem to have used written stimuli as an aid in pronunciation). Results are open to some questions because of the small sample size (66), but the study gives every indication that attention to hearing acuity is of great importance in second language pronunciation instruction. (JB)

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SOME EXTERNAL FACTORS WHICH MIGHT AFFECT L2 LEARNING

In teaching in general, and especially in teaching L2, much discussion and research has been devoted to the development of pupils' speech ability. Speech is one of the most important elements in L2 teaching. The task of a teacher is to enable his students to USE the language OUTSIDE the classroom and to really communicate in it.

The quality of L2 learning-teaching is highly important at the very beginning, which is at the level of elementary school in our case. The student should have a good start because this is the base for his further learning. Apart from modern teaching methods, I believe it is necessary for teachers to know their pupils. The better we know them, the better our teaching results.

I have conducted an experiment with a group of pupils I have been teaching for eight years. They started to learn English in 1971 using an experimental programme. The three principal characteristics of the programme are: 1. Pupils start to learn L2 at an early age (7 years); 2. The number of lessons is 6 per week; 3. The rule "Speak English with your pupils wherever you meet them" has been largely employed.

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The number of stimuli and opportunities for spontaneous use of L2 is even larger at the school where I teach ("Lazar Savatić" Elementary School) because the pupils as well as the teachers spend 8 hours a day at school. Four English teachers work at the school and meet the pupils in various circumstances where real communication takes place. The materials we use are:

manuscripts, L.G. Alexander's textbooks, and various magazines. I did lots of group work (in reading, writing and talking) and communicative song fests together with dancing and outdoor activities. In 1978, three teachers, Eva Kraus-Srebrić[1], Dubravka Šašić and myself tried to introduce a series of provocative stories to enable our pupils to communicate and really use the language. One of the aims was to see how well we taught our pupils to use L2.

Through all these aspects of teaching I have noticed that the pupils who learn English using an experimental programme show better communicative abilities than the ones who learn it using the traditional programme. Nevertheless, the former make many mistakes which differ in type and complexity. I thought it would be useful to study the process of L2 acquisition and the type of mistakes the pupils make as well as difficulties which appear in learning. Briefly, I wanted to discover what happens in "devices" at various phases of learning.

I tried to establish certain external factors which may distort L2 learning. After measuring the noise around the school, I took the pupils for a medical-auditory check-up. The school psychologist measured their intelligence as well. On the basis of these data and certain other variables, together with the data of an articulatory test, I arrived at some tentative conclusions.

Method. I tested the same group of pupils each year, at the same time and using the same vocabulary test (10 words): 1. CAP, 2. LEAF, 3. BALL, 4. CHAIR, 5. PIG, 6. CUP, 7. GIRL,

1) E.S. Kraus is the project leader. More about the project can be read in IATEFL NEWSLETTER, No. 54, 1978.

8. BIRD, 9. BREAD, 10. SHOESHOP. The group and testing conditions were controlled. I focused my attention on the articulation of these words and not on general L2 acquisition for the purpose of more easily realizing certain problems. The test was constructed according to the well-known principles for examining L1 and L2 pronunciation[2]. I recorded the pupils' answers and subsequently phonetically transcribed them. The 10 words contained 32 sounds, which is the maximum score. The results were statistically analyzed.

The aim and tasks of the experiment. My aim was: 1. to improve the pupils' acoustic image of English phonemes by establishing their hearing status; 2. to see whether the articulatory score co-relates to the marks in oral and written knowledge of L2; to the mark in L1 and to the mark in general achievement.

The examinees. The number of pupils tested was n=66. The first test was made in June of the 1972/73 school year (the second year of L2 learning) when the pupils were attending the second grade. The last test will be in June 1979, at which time I will be able to analyze the results as a whole.

Results. In analyzing the results of the mentioned test it became clear to me that there is a great number of uncontrolled factors which may distort the acquisition of articulation of L2 sounds. I tried to discover those factors that are at work even though the basic ones (such as teaching methods, the pupils'

2) Lado, R., LANGUAGE TESTING, Longman, London.
Vasić, S., (RAZVITAK ARTIKULACIJE NA UZRASTU OD 3-9 GODINA), DEVELOPMENT OF ARTICULATION FROM THE AGES OF 3-9), Naučna knjiga, Beograd, 1971.

intelligence and diligence, motivation, etc.) are satisfied.

The first task was to measure the noise around the school. A team of specialists from the Health Secretariat measured it and issued the following results:

"The noise from vehicles exceeds allowed values and may cause excessive tiredness as well as disturbances of the nervous system. At the same time, it reduces the pupils' and teachers' concentration".

The noise around the school distorts learning in general, and especially L2 learning, because new sounds and constructions are presented which do not exist in the pupils' experience. The model gets information on a lesson and the stimulus is verbal. If the verbal stimulation is masked by noise, the pupil cannot get the correct image of a sound. If the noise is not permanent, the incorrect image of the sound can be improved; if it is permanent, the pupil cannot ever have a really good model for correct pronunciation, regardless of the teacher's effort.

If noise is combined with bad hearing, the conditions for L2 learning are even worse. The pupils had a medical check-up of their hearing on two occasions - in 1974 and 1976. The poor results of the first check-up might have been caused by colds[3]. According to the first check-up, 32 pupils had distorted hearing. Only these 32 pupils were re-examined. The check-up in 1976 showed that their hearing was approximately normal, which one would not expect when considering the pronunciation results of the L2 words

3) The check-up was done in a silent chamber of the Institute for Experimental Phonetics and Speech Pathology. Stevo Peter was the examiner.

and the living conditions of the pupils. According to the analysis of the tonal audiogramme[4], a jury categorized the pupils into four groups according to level of hearing disturbance:

I - The first group of pupils had badly disturbed hearing and did not hear sounds under 20 decibels. There were 8 such pupils.

II - The second group of pupils had disturbed hearing and did not hear sounds up to 20 decibels. There were 3 such pupils.

III - The third group of pupils had slightly disturbed hearing and did not hear sounds between 10 and 20 decibels. There were 5 such pupils.

IV - The fourth group of pupils had almost precise hearing. They did not hear sounds up to 10 decibels. There were 16 such pupils.

V - The fifth group of pupils had precise hearing, and numbered 34 pupils.

I analyzed the pupils' results on the articulation test each year, according to five groups of hearing. The results were statistically analyzed by the variance method[5]. Statistical analysis shows whether the hearing factor has distorted the variable of articulation.

In our investigation, the statistical analysis showed that the hearing factor did not influence the pronunciation

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4) Members of the jury were Dr. Smiljka Vasić, Dr. Spasenija Vladisavljević, Vladislava Knaflić and Stevo Peter.

5) Branislav Kentrić, M.Sc., did the statistical analysis.

variable (F=0.73)[6] in the first test (1972/73).

The variance mark in the second test (1973/74) showed that the hearing factor did influence the pronunciation variable (F=2.91). The following results were obtained on counting the standard deviation, the coefficient of variation, and the deviations of some factors from the average: z_1=0.26; z_2=0.28; z_3=-1.14; z_4=1.16; z_5=-1.00[7]. When we take into account absolute values, it is clear that the deviation from average mistakes is least for factor A_1 (group I - pupils with badly disturbed hearing), where z_1=0.26. We can accordingly conclude that factor A_1 is the closest to mistakes, which means that it has the greatest influence on the variable articulatory score. When we rank the pupils' results obtained on the test, we can see that the first group of pupils (badly disturbed hearing) showed the highest number of wrong answers; then comes group II (disturbed hearing), group V (precise hearing), group III (slightly disturbed hearing), and group IV (almost precise hearing). The results support the hypothesis that hearing influences the quality of acquisition of pronunciation. There is the exception of group V of pupils (precise hearing), whose results on the test should have been the best regarding their hearing.

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6) $F=\frac{WA}{WR}$, where F represents the relation between the factorial variance mark and the residual variance mark. Factorial variance (WA) includes the hearing factor whereas residual variance (WR) does not.

7) z indicates the intensity of the factors' influence on variability of score. z_1 is the indicator for group I (badly disturbed hearing; z_2 is the indicator for group II ... and z_5 is the indicator for group V.

In the analysis of the articulatory score according to the hearing status for the third test (1974/75), the variance mark showed that the hearing factor influences pronunciation variability (F=2.05) and: z_1=0.021; z_2=1.58; z_3=0.93; z_4=1.16; z_5=-0.53.

The worst score was indicated by the first group (pupils with badly disturbed hearing), group V's score was slightly better, and then came groups III, IV and V. We can see that group V had rather poor results. The pupils of group II (disturbed hearing) showed the best results. In 1974/75, writing was introduced and I think that the written sign stimulated the oral one.

In the analysis of the articulatory score according to the hearing status for the fourth test (1975/76), F=3.27 and: z_1=-0.35; z_2=1.27; z_3=-1.30; z_4=1.05; z_5=-0.67. The first group of pupils (I - badly disturbed hearing) showed the worst results, and then came groups V, IV, II, III. It is obvious that in group IV (almost precise hearing) the pupils' score constantly decreased. The pupils with precise hearing (group V) constantly showed bad results.

In the analysis of the articulatory score according to the hearing status for the fifth test (1976/77), the results were as follows: F=2.81 and z_1=0.16; z_2=1.45; z_3=-1.37; z_4=0.55; z_5=-0.79 in the following order: group I (badly disturbed hearing), IV (almost precise), V(precise hearing) and group II (disturbed hearing). We can see that the worst results were those of group I of pupils.

In the analysis of the articulatory score according to hearing status for the sixth test (1977/78), F=3.58 and z_1=1.72; z_2=-0.84; z_3=-0.86; z_4=0.54; z_5=-0.54, with the following rank:

groups IV and V (almost precise and precise hearing), III (slightly disturbed hearing), I (badly disturbed hearing). According to this test, we can see that the pupils with precise hearing showed the worst results while pronouncing the test-words. Table 1. shows the pupils' results according to the year of testing. The groups are ranked from the worst to the best results.

Table 1. AT results for each year

1972/73	1973/74	1974/75	1975/76	1976/77	1977/78
	I	I	I	I	IV and V
	II	V	V	IV	II
	V	III	IV	V	III
	III	IV	II	III	I
	IV	II	III	II	

Table 2. presents data on -F-. F is the indicator of the influence of certain factors on the results of the articulatory test. The first column shows the grade the pupils attended and the second one defines the school year. In the third column, there are data about F, that is, data about the relation between the two variance marks. Looking at F, we can see that the scores on the articulatory tests are progressive with obvious declines in the fourth and sixth grades[8]. The declines in these two grades were caused by pre-puberty and puberty crises. These crises were indicated by Dr. Smiljka Vasić and Dr. Vera Lukić on analyzing certain other aspects of L1 verbal development.

". . At the older age levels, the decreasing percentage of characteristic answers reflects the examinees' mental condition

8) Grade IV pupils are 9-10 years old and in grade VI - 11-12.

and their wish for individual answers (pre-puberty and puberty crises)[9]..."

Table 2. The influence of the hearing factor on AT[10] results

Grade	Year of testing	F	z_1	z_2	z_3	z_4	z_5
II	1972/73	0.73	/	/	/	/	/[11]
III	1973/74	2.91	0.26	0.28	-1.14	1.60	-1.00
IV	1974/75	2.05	0.02	-1.58	0.93	1.16	-0.53
V	1975/76	3.37	0.35	1.27	-1.30	1.05	-0.67
VI	1976/77	2.81	0.16	1.45	-1.37	0.55	-0.79
VII	1977/78	3.58	1.72	-0.84	0.86	0.54	-0.54

Pupils' motivation and economic status as intervening variables. The correct acquisition of L2 sounds was not influenced by the hearing factor on the first AT (1972/73). The pupils were adjusting to the pronunciation of L2 sounds and they were all in the same situation - they did not know the language (this was the second year of learning English). Pronunciation varied from child to child without particular regularity[12].

We can see from the results of the AT in 1973/74 (Table 1. results for each year), with the exception of group V (precise

9) Vasić, S., (1976), DEVELOPMENTAL VERBAL NORMS IN OUR CHILDREN, (RAZVOJNE GOVORNE NORME U NAŠE DECE), Prosveta, Beograd, p. 94.

10) AT - abbreviated form for "articulatory test".

11) As -F- is less than one (it means that the hearing factor has not had any influence on pronouncing variability), it was not necessary to calculate $z_1 \ldots z_5$.

12) It is possible that some pupils' pronunciation of L1 (the Serbo-Croatian language) was not stable at this age as their verbal development was still ongoing.

hearing), that hearing does influence the correct acquisition of L2 sounds. This leads us to the conclusion that there are some intervening variables such as motivation and economic status. I have defined the degree of pupil motivation, using a qualitative scale, by grouping all the pupils into six groups according to their motivation for L2 learning, regardless of their hearing status and their mark in English. These groups are: 1. highly-motivated pupils; 2. rather motivated; 3. barely motivated; 4. barely unmotivated; 5. rather unmotivated; 6. highly unmotivated. As I have been teaching the same group of pupils for eight years, I think I can define the pupils' motivation for the subject on the basis of my general impression of their interest for learning it. Tables 3. and 3a. show pupil motivation for learning English. After defining the pupils' motivation, I examined 6 degrees of motivation according to the hearing groups. The first column of Table 3. indicates the hearing group, and the other 6 columns indicate the percentage of variously motivated children within the hearing groups.

Table 3. Estimate of pupil motivation for L2 learning

Hearing groups	Highly motiv.	Rather motiv.	Barely motiv.	Barely unmotiv.	Rather unmotiv.	Highly unmotiv.
I	6.25	12.50	/	/	/	25.00
II	/	33.33	66.60	/	/	/
III	/	80.00	20.00	/	/	/
IV	13.30	20.00	26.66	/	/	13.30
V	28.57	20.00	8.57	17.14	14.28	11.42

For the purpose of a better survey, we can consolidate the first three groups (highly motivated, rather motivated and

barely motivated pupils) into one group and speak about it as a group which includes pupils positively motivated for learning English. The other three groups (barely unmotivated, rather unmotivated, and highly unmotivated) form one group which includes pupils negatively motivated for L2 learning.

Table 3a. Positively and negatively motivated pupils

Hearing groups	Positively motivated	Negatively motivated
I	75.00%	25.00%
II	100.00%	/
III	100.00%	/
IV	59.00%	39.96%
V	57.14%	42.84%

The pupils in hearing groups II and III (disturbed and slightly disturbed hearing) were 100% positively motivated for L2 learning. If we look at the number (percentage) of positively motivated pupils, we can see that the second and third groups are followed by group I (badly disturbed hearing) with the largest number of highly motivated pupils (75%); this may be the cause of sudden improvement - from the worst to the best place in grade VII (1977/78) - on the AT score[13].

There were 59.66% positively motivated pupils in group IV (almost precise hearing) and 39.96% negatively motivated pupils for L2 learning. There were 55.14% positively motivated pupils and 42.84% negatively motivated ones in group V (precise hearing). A rather large percentage of negatively motivated pupils among those with precise hearing and almost precise hearing (groups IV and V)

13) See Table 1. AT results for each year - page 8.

could have caused the permanent decline of articulatory score of these pupils. The other cause of the decline is the fact that the pupils with better hearing did not pay attention to pronunciation. They registered the sounds once and did not bother to think about them any more. They started to pronounce them carelessly. The same happened in L1 verbal behaviour. The pupils with disturbed hearing were much more careful regarding correct pronunciation of sounds.

Economic status of pupils. The economic status of pupils was defined but the results showed no dependence upon or connection with AT scores. We can tentatively conclude that there is no regularity between the pupils' economic status and the results they attained on the AT. This might have been caused by the small number of examinees.

Economic status was defined as Good and Bad. Table 4. shows the results.

Table 4. Economic status of the pupils[14)]

Hearing groups	Good (percentage)	Bad
I	75.00%	25.00%
II	66.60%	33.33%
III	80.00%	20.00%
IV	60.00%	40.00%
V	80.00%	20.00%

The connection between marks in English and Serbo-Croatian, general achievement, and the AT results. My intention

14) Economic status was defined by the use of data from the class book.

concerning the above connection was to discover whether the changes of AT scores and the other marks were identical. The correlation rank -r- was considered for each group according to the groups of hearing.

The connection between marks in oral knowledge of L2 and AT scores. We can see that there is a higher correlation of the two marks for the pupils with better hearing. It can be concluded that hearing influenced verbal knowledge of L2 and the pupils with better hearing attained better results with the exception of group V (precise hearing), where r=0.38[15]. Table 5. shows the connection between these two marks.

Table 5. The connection between marks in L2 oral knowledge and AT scores.

Groups	I	II	III	IV	V
-r-	0.03	0.14	0.65	0.68	0.38

The connection between marks in written knowledge of L2 and AT scores. According to the results in Table 6., we can see a higher correlation between L2 written knowledge and AT score in pupils with disturbed hearing. The same relation was noticed on the 1974/75 AT, when the introduction of written skills improved pronunciation. On the basis of this regularity, I started to introduce visual stimulus together with the auditive one (phonetical transcription as well, when teaching new, difficult words) in order to improve the pupils' pronunciation.

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15) -r- correlation rank value is from the -1 to 1. If r is close to 1, the correlation is high. It is highest when r=1. If r=0, the two factors do not correlate at all.

Table 6. The connection between two marks: L2 written skill and AT score.

Groups	I	II	III	IV	V
-r-	0.90	0.52	0.00	0.93	0.00

There was no connection between the two marks of pupils in groups III (slightly disturbed hearing) and V (precise hearing). The pupils in group IV (almost precise hearing) showed the best results: their AT scores correlated with both the written and oral knowledge of L2.

The connection between marks in L1 and AT score. We can conclude according to the data in Table 7. that AT score did not correlate with the L1 mark in the first three groups (they all had variously disturbed hearing); that it remarkably correlated with group IV (almost precise hearing), where r=0.98; and that there was a connection with group V (precise hearing), where r=0.57. It seems that the pupils with better hearing attained better results in L1 learning.

Table 7. The connection between marks in L1 and AT score

Groups	I	II	III	IV	V
-r-	0.21	0.16	0.17	0.98	0.57

The connection between marks in general achievement and AT score. According to the data in Table 8., we can conclude that the highest connection between the two factors occurs in group II (disturbed hearing). The fact that these pupils' average mark in general achievement was the lowest (3.77) supports our conclusion that the hearing factor influences learning in general.

The pupils of this group were most intelligent[16] with IQ=45.29.

Table 8. The connection between marks in general achievement and AT score

Groups	I	II	III	IV	V
-r-	0.13	0.88	0.34	0.83	0.49

The data on the pupils' IQ are presented in Table 9. I calculated the average scores of the pupils' IQ for each group of hearing separately. The possible influence of intelligence on L2 learning has not been studied in this paper.

Table 9. IQ of pupils according to the hearing groups and the average mark of the groups' general achievement[17]

Groups of hearing	IQ	General success
I	44.50	3.22
II	50.66	3.77
III	46.40	4.60
IV	46.86	4.13
V	45.29	4.05

Discussion of the results and conclusions. Although the pupils' results cannot be analyzed as a whole, which will be possible only after the last AT (in June 1979), it seems possible to conclude certain facts which may contribute to a better knowledge of our pupils and to adjusting teaching methods to the

16) Bistrica Komadina, M.Sc., the school psychologist, measured the pupils' IQ.

17) In Yugoslavia, we mark pupils as follows: 1, 2, 3, 4, 5. Mark -1- is insufficient; 2 is passing; 3 is good; 4 is very good; and 5 is excellent.

pupils' needs and abilities as well as to the environmental conditions within which they learn.

- Disturbed hearing has a negative influence on learning in general, and especially on the learning of verbal skills. It would be useful if we controlled the pupils' hearing on enrolment and periodically during schooling. The results of the hearing check-up should be available to the teachers so that they can be adequately used in the educational process. On the basis of these data, greater care could be given to some pupils and it would be possible for us to timely prevent the incorrect acquisition of linguistic or other skills in the educational process. These pupils would need a special method and an individual approach.

- I think that the conclusions derived from the articulatory test would be more valid if there had been more subjects. This was particularly obvious with the intervening variable of economic status. The fact that there has not been any dependence may mean that a full-day school eliminates the negative influence of this factor.

- Noise around the school negatively influences learning in general, and L2 learning in particular. Greater consideration should be given to school location and the possible technical isolation of noise.

- This paper is intended to be a contribution to discovering factors that cause failure in learning other than motivation and intelligence only, because it has been proved that the latter are insufficient to explain variations in learning achievement.

- The factors of teacher and method have been controlled

in this experiment by the fact that the pupils were taught by the same methods and by the same teacher. In these conditions, the result (obtained casually) indicating crises in AT achievement in grades IV and VI, which coincides with the results of other investigations (of pupils' verbal behaviour), seems interesting. This period is critical not only for behaviour in general, but for verbal behaviour as well, and it should be taken into account when we think of improving the educational process.

A B S T R A C T

SOME EXTERNAL FACTORS WHICH MIGHT AFFECT L2 LEARNING

Disturbed hearing influences learning in general, and it affects the acquisition of L2 verbal skills even more. It would be useful if pupil hearing status was controlled just before and during elementary schooling to that teachers could adequately use the results in the educational process.

We should not neglect the verbal skills of those pupils with precise hearing.

Noise around the school affects learning on the whole and disturbs L2 learning especially.

The fact about crises which appear at the age of 10 relevant to the articulation of English sounds seems noteworthy. This period is critical not only for behaviour in general, but for verbal behaviour as well, and should be taken into account in our efforts to improve the educational process.